DOCUMENT RESUME

ED 288 615 PS 016 922

AUTHOR Butterworth, George; Adamson-Macedo, Elvidina
TITLE On the Origins of Pointing in Infancy: A Pilot Study.
PUB DATE Sep 87
NOTE 10p.; Paper presented at the Annual Conference of the British Psychological Society (York, England, United Kingdom, September 11-14, 1987).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Age Differences; Cognitive Development; Foreign Countries; *Incidence; *Infant Behavior; *Novelty (Stimulus Dimension)
IDENTIFIERS Developmental Patterns; *Pointing Behavior; *Scotland

ABSTRACT

Observations were made of the incidence of pointing behavior among infants differing in age when a radio-controlled truck entered the room in which mother and infant were seated. Infants' reactions over 5 to 6 minutes were recorded on videotape. Recordings were analyzed to establish the incidence of pointing, handedness of pointing, whether pointing occurred when the object was moving or stationary, the incidence of concurrent vocalizations, and whether pointing occurred when the truck was near the infant or futher away. Subjects were 38 infants who were 6-10, 11-16, or 18-21 months of age. Findings indicated that index finger pointing was evident as early as 8.75 months; by 14 months it was accompanied by extensive vocalization and visual monitoring of parent and the truck. Pointing was most likely to occur when the truck was in "near" space and stationary. It is concluded that pointing may be differentiated from reaching as soon as it can be observed; pointing may involve processes of "focal" attention, and its expression may depend on cognitive developmental changes which allow a pre-existing, conjoint visual-tactual inspection process to be applied to objects out of reach. (RH)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

X This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

ED288615

On the origins of pointing in infancy*

A pilot study

George Butterworth and Elvidina Adamson-Macedo

Department of Psychology

University of Stirling

Scotland.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

G. Butterworth

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

PS 016922

Poster presented at the Annual Conference of the Developmental Psychology Section, British Psychological Society, University of York, September 1987.

On the origins of pointing in infancy*

A pilot study

George Butterworth and Elvidina Adamson-Macedo

University of Stirling

Scotland.

ABSTRACT

Various theories exist as to the developmental origins of manual pointing. It has been suggested that it differentiates from failed prehension; that it is a socially transmited gesture or that it may be related to conjoint visual-tactual inspection. We studied the incidence of pointing in babies aged 6-10 months, 11-16 months and 18-21 months,when a novel event occurred in the presence of the mother (or father).

Index finger pointing was observed as early as 8.75 months and by 14 months it was accompanied by extensive vocalisation and visual monitoring of the mother and target. It was most likely to occur to locations in "near" space, when the interesting object was stationary. These pilot data suggest that pointing may be differentiated from reaching as soon as it can be observed; that pointing may recruit processes of "focal" attention and that its expression may depend on cognitive developmental changes which allow a pre-existing, conjoint visual-tactual inspection process to be applied to objects out of reach.

*RESEARCH CARRIED OUT WITH A GRANT FROM THE ECONOMIC AND SOCIAL RESEARCH COUNCIL OF GREAT BRITAIN.

INTRODUCTION

Manual pointing, defined as the use of an outstretched arm and index finger to denote an object in visual space, is species-specific to humans. Use of the index finger can be distinguished from whole body orienting observed in other species. It has been called " the most specialized motoric means for the expression of reference" (Werner and Kaplan 1963).

There is a sparse literature on the development of manual pointing, although it is generally agreed that comprehension of at about 10 months precedes production at about 14 months (Schaffer 1984).

Theorists do not agree on the origins of the pointing gesture. Preyer (1888) included pointing in his discussion of expressive movements. He suggested that the use of the index finger must rest upon an hereditary coordination and that in its original manifestation, it expresses a wish to sieze. Vygotsky (1926) argued that pointing develops as a result of the mother's response to the infant's failed attempts to reach objects. He described early pointing as an unsuccessful grasping movement that becomes endowed with meaning by the mother. Millicent Shinn (1900 quoted in Schaffer 1984) suggested that manual pointing may develop out of an earlier, fine, conjoint visual- tactual inspection of objects. The infant of 8 or 9 months who is particularly interested in an object will simultaneously touch it with the index finger, while closely observing the exploration. She suggests that pointing begins soon after, as an extension of the conjoint -visual tactual inspection to objects at more distant locations. On this account, pointing develops by the application to an extended space, of a pre-existing intersensory coordination between vision and touch used for fine inspection.

The onset of manual pointing using the index finger may also be related to cognitive developmental changes that underly early instrumental behaviours and tool use. Index finger-thumb opposition appears at about 28 weeks and increases to complete opposition at about 44 weeks. As Gesell and Halverson (1936 p349) noted:

"the thumb divorces itself from the forefinger in order that it may better cooperate with it".

This analysis offers another way to understand the manual posture involved in the pointing gesture. It can be understood as the inverse of the finger-thumb opposition involved in taking a precise grip. Our own research on mechanisms underlying the production of pointing has just begun, it will include measures of cognitive development and of reaching and grasping. This paper presents the results of a pilot study in which we attempted to elicit pointing in babies. Our aim here is to generate critical feedback to help in planning subsequent experiments.

SUBJECTS

Three groups of babies were tested:

Group I comprised 16 babies (3 boys and 13 girls) aged between 6 and 10 months. Their average age was 253.6 days SD 67.4 days.

Group II comprised 16 babies (12 boys and 4 girls) aged between 11 and 16 months (average age 391.2 days SD 61.6 days).

Group III comprised 6 babies (2 boys and 4 girls) aged between 18 and 21 months (average age 570.8 days SD 36.9 days).

Eight further subjects were tested but they either failed to complete the experiment or apparatus problems precluded using their results.

METHOD

The method was similar to that adopted by Campos and Stenberg (1980) in their studies of "emotional referencing". The mother and baby were seated in the corner of a large, empty room (Fig 1) and mother was instructed to allow the baby to draw her attention to a radio controlled truck which unexpectedly entered the laboratory. The truck approached the baby by an irregular path with truck movement randomly interspersed with stationery episodes. The infants' reactions over 5 to 6 minutes were recorded on video-tape using a split screen recording system.

The video-recordings were subsequently analysed to establish the incidence of pointing, handedness of point, whether pointing occured when the object was moving or stationery, the incidence of concurrent vocalisations; whether pointing occurred when the car was near the infant or further away. "Near space" was arbitrarily defined as the space within the field of view of the paired video-cameras while "far space" was defined as the space outside the field of view of the cameras.

RESULTS

TABLE 1

MEAN FREQUENCY OF POINTING AND VOCALIZING OVER 5-6 MINUTES OF TESTING

AGE GROUP	N	NUMBER AND SEX OF BABIES POINTING	MEAN FREQUENCY OF POINTING	MEAN FREQUENCY OF VOCALIZATION
6-10MO	13F 3M	4F OM	5.2	10.7 (4.0)*
11-16MO	4F 12M	3F 7M	6.8	17.6 (3.62)*
18-21MO	4F 2M	2F 3M	8.6	43.0 (2.20)*

* MEAN NUMBER OF VOCALISATIONS UNACCOMPANIED BY POINTING

TABLE 2

RELATIONSHIP OF POINTING TO SPATIAL LOCATION AND MOTION OF TARGET

MEAN RATE OF POINTING OVER DURATION OF STUDY

Age group	6-10 MO.		11-16 MO.		18-21 MO.	
	STATIONERY	MOVING	STATIONERY	MOVING	STATIONERY	MOVING
NEAR	5.25	0.0	5.0	1.5	5	2.2
FAR	0.0	0.0	0.5	0.1	0.8	0.6

SUMMARY OF MAIN RESULTS

ALTHOUGH THE INCIDENCE OF POINTING INCREASED WITH AGE, THE RATE WAS SIMILAR OVER ALL THREE AGE GROUPS. THE YOUNGEST INFANT TO SHOW INDEX FINGER POINTING WAS 7 MONTHS AND 3 WEEKS OLD. POINTING OCCURRED ALMOST ENTIRELY WHEN THE TRUCK WAS IN NEAR SPACE AND STATIONERY.

THERE WAS AN INCREASE IN THE AMOUNT OF POINTING AND CONCURRENT VOCALIZATION WITH AGE AND A DECREASE IN VOCALIZATION ALONE..

CONCLUSION

The pilot study showed that even very young babies will point manually using the index finger. There was little evidence that infants who fail to point attempt to reach for the object. Thus, it seems unlikely that pointing develops from failed reaching.

Pointing occurred almost entirely when the truck was stationery in near space. It is possible that this may be related to the distinction that has been made between "focal" and "ambient" attention processes, thought to be specialised for object identification and for perception of movement (Trevarthen 1968). If so, this would suggest that the production of manual pointing is closely linked to mechanisms governing attention.

That pointing and speech development are related is also apparent. From the outset, pointing is accompanied by vocalisation (in fact vocalization was present even when pointing was not observed. These unaccompanied vocalisations also occurred when the object was stationery in "near" space).

In the full experiment now being performed we intend to test more carefully for handedness of pointing; for the sequential order and concurrence of vocalising, looking and pointing and for evidence on the development of divided attention to establish at what age is the infant capable of looking at mother while pointing at the truck. This will give an indication of the extent to which representational abilities may enter into the control of pointing.

REFERENCES

Campos,J.J and Stenberg C.R. (1980). Perception, appraisal and emotion. The onset of social referencing. In M. Lamb and L. Sherrod (eds) Infant Social Cognition.: L. Erlbaum: New Jersey.

Gesell, A.and Halverson, H. M. (1936). The development of thumb opposition in the human infant. Journal of Genetic Psychology 48 339-61.

Schaffer, H.R. (1984). The child's entry into a social world. Academic Press: New York and London.

Trevarthen, C. (1968) Two visual systems in primates. Psychologische Forschung 31 299-377.

Vygotsky, L. S. (1962).Thought and language.M.I.T.Press: Cambridge (first published 1926).

Werner, H. and Kaplan, B. (1963) Symbol formation. Reprinted Erlbaum: New Jersey 1984.